SBC6300x

ARM9 Based Single Board Computer

Hardware Manual

Version 1.1

16th Jan 2014

mbest
A Premier Farnell Company

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Revision History:

Version	Date	Description
1.0	21/10/2013	Original Version
1.1	15/01/2014	Localisation

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1 Overview

1.1 Product Information

The SBC6300X is a single board computer (SBC) designed and built by Embest. The SBC is based on the Atmel AT91SAM9263 MCU with a 32-bit ARM instruction set and a complete embedded software environment. It has a flexible design with a tiny controller board (Mini6300); mounted directly on an expansion board through two 0.8mm 100pin Free Height (FH) surface-mount connectors. The CPU board of SBC6300X has the ARM9 processor and memory on board. The expansion board offers various hardware interfaces including 8 UARTs, 2 Ethernet ports, USB Host and Device, CAN, TWI, LCD, Touch Screen, Keyboard, SD card, Jtag, Audio and etc.

The rich industrial bus interface resources of this sing board computer makes it ideal for embedded applications requiring wide operating temperature ranges, and flexible I/O connectivity. It can be used in many application fields, such as:

- Medical Equipment,
- Industrial Field Control,
- Smart Instrumentation,
- Industrial Control Devices,
- Monitoring,
- Automotive Electronics.

1.2 Kit contents

- ✓ SBC6300X board
- ✓ USB cable
- ✓ Serial cable
- ✓ Ethernet Cable
- ✓ 12V power adapter
- ✓ **Optional** 4.3” or 7” LCD

1.3 Board Interfaces

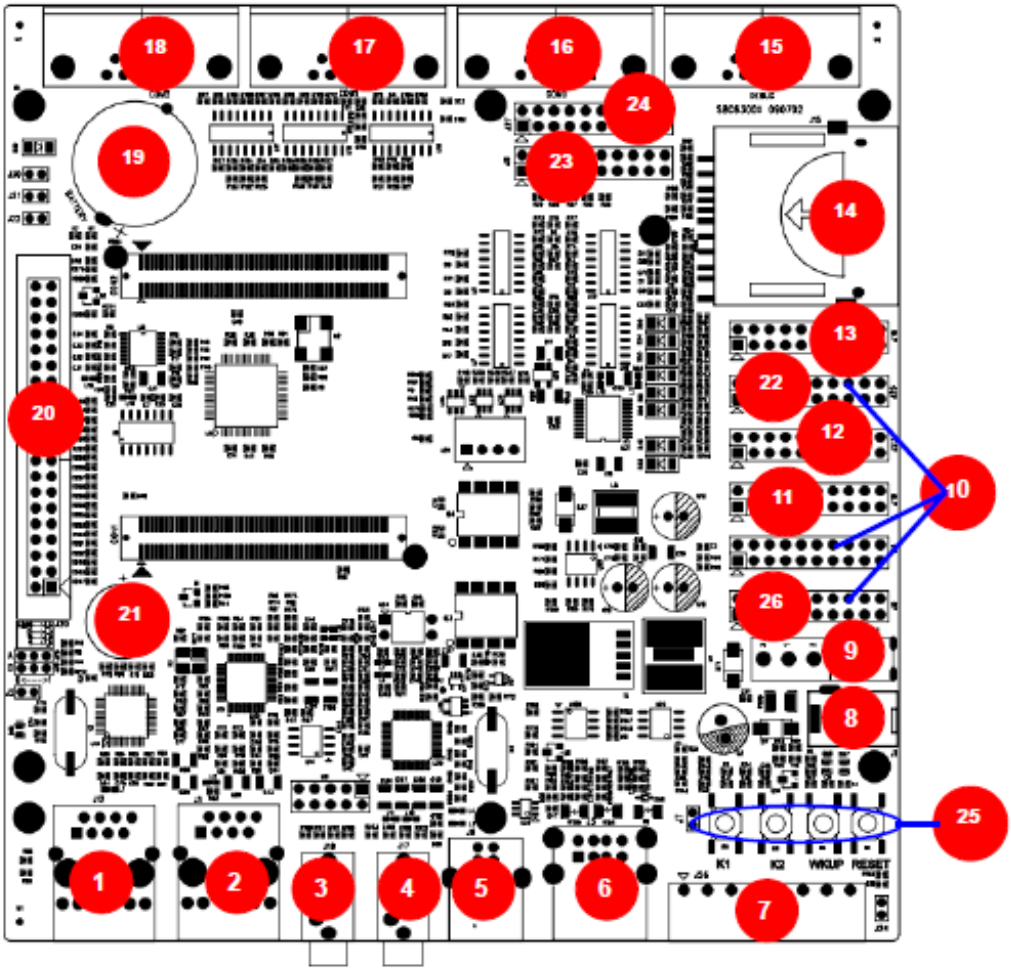

Figure 1: SBC6300X Board Interfaces

No.	Function	No.	Function
1	NET1 (DM9000)	14	SD card
2	NET0	15	Debug
3	Audio Input (Mic)	16	COM0
4	Audio Output (earphone)	17	COM1
5	USB Device	18	COM2
6	Two USB Host	19	Battery
7	CAN	20	LCD/Touch Screen
8	Power (+12V)	21	Buzzer
9	Power On/Off	22	TWI
10	41 GPIOs (Multiplex function: SPI1, PWM, SDIO0, ISI)	23	Jtag
11	ADC	24	TTL (Debug/COM0/COM1/COM2)
12	EXT_COM (4RS232)	25	Keys
13	Keyboard	26	Panel

1.4 System Block Diagram

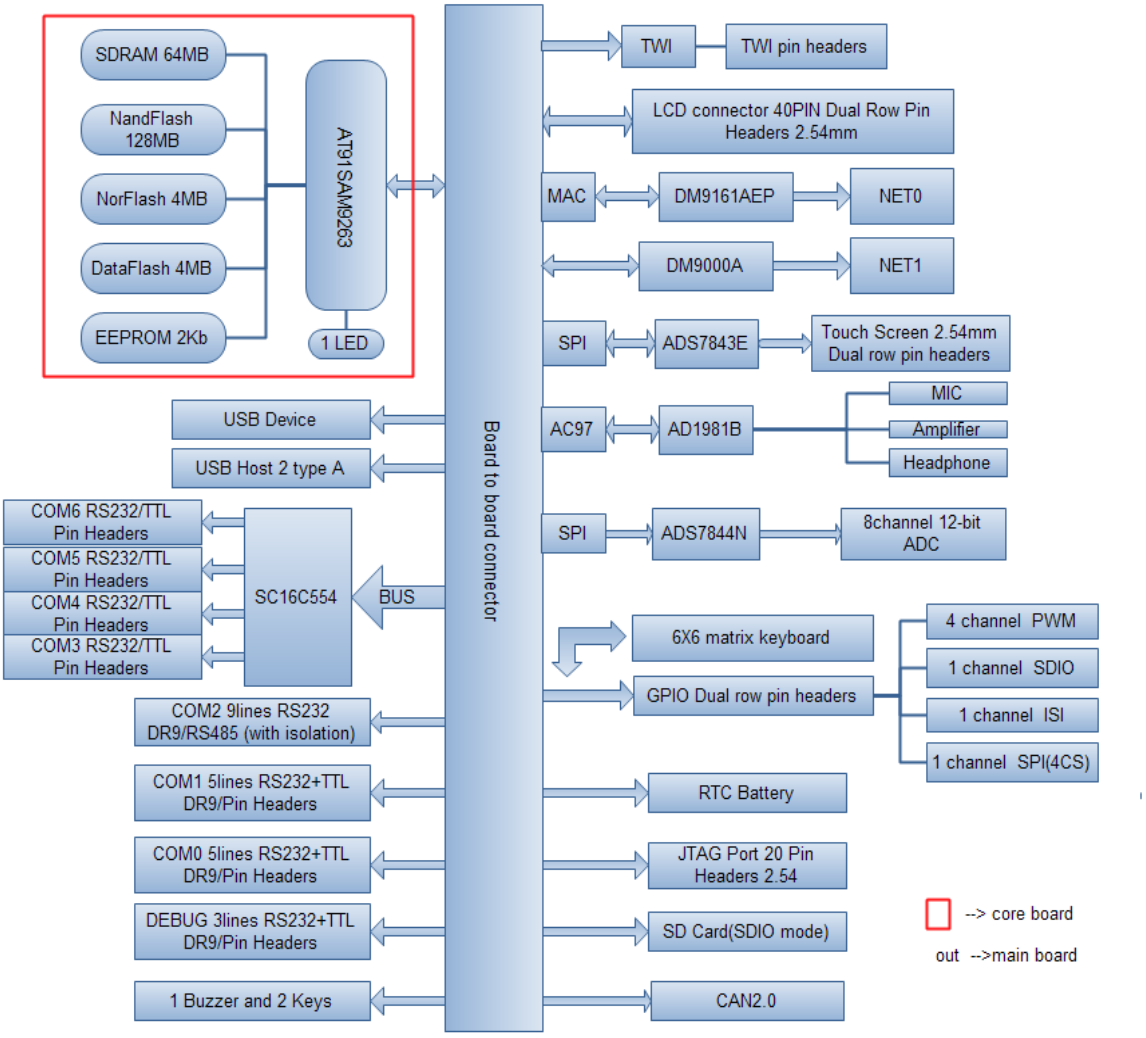

Figure 2: SBC6300x System Block Diagram

1.5 Physical Dimensions

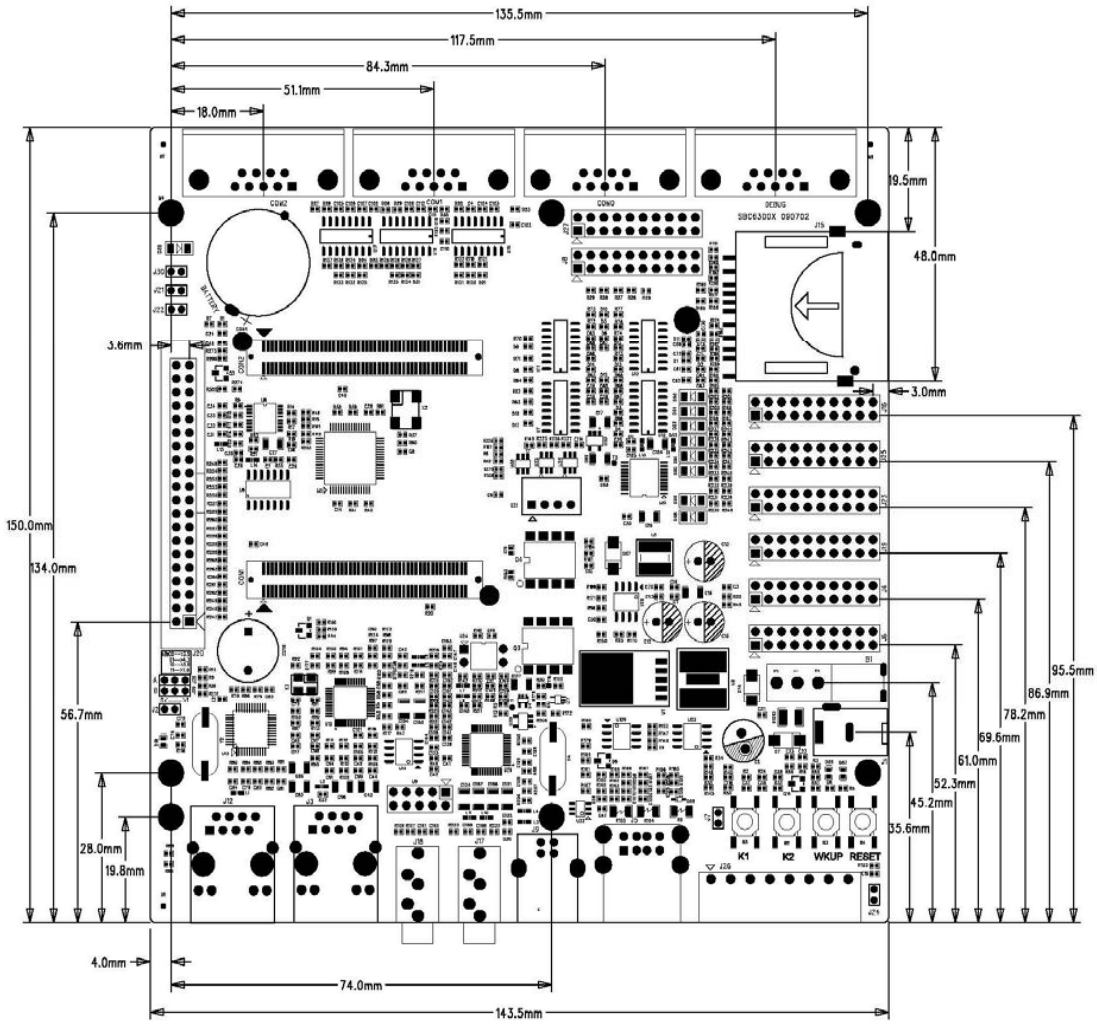

Figure 3: SBC6300x Physical Dimensions

2 Hardware Features

The SBC6300x consists of：

- Main board（150 x 143.5mm）
- Core board（52 x 52mm）

And the following optional modules:

- LCD module 3.5” (240 x 320mm)
- LCD module 4.3” (480 x 272mm)
- LCD module 5.6” (640 x 480mm)
- LCD module 7.0” (800 x 480mm)

2.1 Processor

- AT91SAM9263，ARM926EJ-STM ARM
- Extended DSP instruction
- ARM Jazelle technology providing Java acceleration capability
- 16K data butter, 16K instruction buffer, write buffer
- Work performance goes up to 220 MIPS when the frequency is 200MHz
- Memory management unit
- Embedded ICE, support for Debug Communication Channel
- Medium sized, embedded macrocell structure

2.2 On-Board Memory

- 128K on-chip ROM, single-cycle visit at maximum bus access
- 80K on-chip SRAM, single-cycle visit at maximum processor or bus access

2.3 Core Board Functions

Categories	Function	Parameters
Processor	CPU	Atmel AT91SAM9263, ARM9,200MHz
Memory	SDRAM	64MB
	NAND Flash	128MB
	Data Flash	4MB
	NOR Flash	4MB
	EEPROM	2Kb
Others	LED	1 LED for System Status Indicator

Dimensions of core board: 52 x 52mm

Connector type: Tyco 5179031-4

2.4 Main Board Functions

Categories	Function	parameters
Memory	SD card	SDIO mode supports Hot-swapping
Power	Power input	8~20V, default 12V power input
	Power Output	5V & Vin
Communication	UART	DEBUG: RS232/TTL 3line
		COM0: RS232/TTL 5 line
		COM1: RS232/TTL 5 line
		COM2: RS232/TTL/half duplex RS485(isolated) 3line
		COM3-6: RS232/TTL 5 line extended
	CAN	CAN2.0 communication interface
	NET0	MAC in MCU，10/100Mbps with LED
	EXT_NET	DM9000 extend net，10/100Mbps with LED
	USB Host	2-channel USB 2.0 HOST

	USB Device	1-channel USB 2.0 device
	TWI	MAX:400Kbps, slave or master mode
LCD	TFT LCD	2048 x 2048 (max), 16bit RGB mode, with 3.5, 4.3, 5.6 & 7" LCD support
In/output	Touch screen	4 line resistance touch screen connector
	Matrix keyboard	6x6 Matrix keyboard , can be used for general IOs
	Audio In	Audio input
	Audio Out	Play MP3, provide 1.5W audio amplifier output through pin headers
	ADC	8 channel 12bit ADC input
General	GPIO	41 GPIO, multiplex ISI connector 4channel PWM 1 channel SDIO connector 1 channel SPI1 connector（4 CS）
	Buzzer	1 BUZZER controlled by a GPIO
	JTAG	Standard 20PIN JTAG debug interface
	Key	2 GPIO keyboard,1 WKUP key, 1 RESET key
	Panel	Power input indicator, main board power indicator, Provide WKUP, IO, RESET, power switch panel connector
Other	Watchdog	
	RTC	RTC (with backup battery)

3 Hardware Details

3.1 Interfaces

3.1.1 Power（J26，J1）

- Power input: DC jack J1 and 2PIN3.81mm wire connector
- Pin 2 in j26 can be used as power input and output ,1500mA limited
- Pin 3 in j26 can be used as power output only ,500mA limited
- Vout=Vin=12V

GND	1
+12V	2
+5V	3
GND_485	4
485A	5
485B	6
CAN_L	7
CAN_H	8

3.1.2 NET0（J3）

- Ethernet (WAN), 10/100M, with status indicator and isolation transformer RJ45
- MCU internal MAC

RJ45 Interface definition:

TX+	**1**	**2**	TX-
RX+	**3**	**4**	+2.5V
+2.5V	**5**	**6**	RX-
NC	**7**	**8**	NC
+3.3V	**9**	**10**	LED1
LED2	**11**	**12**	+3.3V

Resource from MCU:

MAC	**PC25**	ERXDV
	PE21	ETXCK
	PE23	ETX0
	PE24	ETX1
	PE25	ERX0
	PE26	ERX1
	PE27	ERXER
	PE28	ETXEN
	PE29	EMDC
	PE30	EMDIO
	PE31	INT_output

3.1.3 NET1 (J12)

Extended by M9000CEP, resources from the MCU are as follows:

DM9000	D0-D15	
	A2	
	PD4	INT
	PD11	EBI0_NCS2

RJ45 Interface definition:

TX+	1	2	TX-
RX+	3	4	+2.5V
+2.5V	5	6	RX-
NC	7	8	NC
+3.3V	9	10	LED1
LED2	11	12	+3.3V

3.1.4 UART（8 channels）

UART connectors（DEBUG，COM0，COM1，COM2，J23）

3.1.5 DEBUG（DEBUG）

- Resources from the MCU are as follows:

DEBUG	PC30	DRXD
	PC31	DTXD

- Signal input/output level: RS232
- Maximum data rate: 115.2kbps
- Flow Control: None
- Connector: DR9 male
- At the same time lead out through pin headers with TTL

3.1.6 COM0，1（COM0，COM1）

- Resources from the MCU are as follows:

UART0	PA26	TXD0
	PA27	RXD0
	PA28	RTS0
	PA29	CTS0
UART1	PD0	TXD1
	PD1	RXD1
	PD7	RTS1
	PD8	CTS1

- Signal input/output level: RS232
- Maximum data rate: 115.2kbps
- Flow Control: CTS, RTS
- Connector: 2.54mm pitch connector/DR9(RS232)

3.1.7 COM2（COM2）

- Resource from MCU as follows:

485/UART2	PD2	TXD2
	PD3	RXD2
	PD13	RE/DE(485)

- Signal input/output level: RS232/RS485(with isolation)
- Maximum data rate: 115.2kbps
- Flow Control: none
- Connector: 2.54mm pitch connector(TTL)/DR9(RS232)
- Direction of RS485: PD13→0 send
- 1 receive

RS485 connector definition：

1	GND
2	+12V
3	+5V
4	GND_485
5	485A
6	485B
7	CAN_L
8	CAN_H

The DEBUG, COM0, COM1, COM2,TTL level on J27 definition as follows：

default RS232 COM0	GND	**1**	**2**	GND	DEBUG TTL
	TXD0R	**3**	**4**	PD2	
	RXD0R	**5**	**6**	PD3	
	RTS0R	**7**	**8**		

	CTS0R	**9**	**10**	GND	COM2 TTL
default RS232 COM1	RXD1R	**11**	**12**	PC31	
	RXD1R	**13**	**14**	PC30	
	RTS1R	**15**	**16**		
	CTS1R	**17**	**18**		
	GND	**19**	**20**		

The DR9 male connector definition as follows:

Pin number	Function
1、4、6、9	NC
2	RXD
3	TXD
5	GND
7	CTS
8	RTS

3.1.8 EXT_COM（J23）

These uarts come from the SC16C554, 5lines, default RS232 and offer support for TTL by changing resistors according your need.

Resources from the MCU are as follows:

EXT_COM	A0-A6	Sys bus
	D0-D6	Sys bus
	PD6	EBI0_NCS4
	PE16	INT1
	PA23	INT2
	PA24	INT3
	PA25	INT4

J23 connector definition as follows：

GND	**1**	**2**	GND
EXT_COM1_TXD	**3**	**4**	EXT_COM3_TXD
EXT_COM1_RXD	**5**	**6**	EXT_COM3_RXD
EXT_COM1_RTS	**7**	**8**	EXT_COM3_RTS
EXT_COM1_CTS	**9**	**10**	EXT_COM3_CTS
EXT_COM2_TXD	**11**	**12**	EXT_COM4_TXD
EXT_COM2_RXD	**13**	**14**	EXT_COM4_RXD
EXT_COM2_RTS	**15**	**16**	EXT_COM4_RTS
EXT_COM2_CTS	**17**	**18**	EXT_COM4_CTS
GND	**19**	**20**	GND

3.1.9 Matrix keyboard（J16）

- Dual pin headers 2.54mm
- These pins can be used as general IOs or 6x6 matrix keyboard
- Voltage：0V（low），3.3V（high）
- Resources from the MCU are as follows:

GPIO/KEYBOARD	PB6	IO(pull up)
	PB7	IO(pull up)
	PB11	IO(pull up)
	PB19	IO(pull up)
	PB20	IO(pull up)
	PB21	IO(pull up)
	PB22	IO
	PB23	IO
	PB24	IO

	PB25	IO
	PB26	IO
	PB27	IO

J16 connector definitions are as follows：

VDD33	**1**	**2**	VDD33
PB22	**3**	**4**	PB6
PB23	**5**	**6**	PB7
PB24	**7**	**8**	PB11
PB25	**9**	**10**	PB19
PB26	**11**	**12**	PB20
PB27	**13**	**14**	PB21
GND	**15**	**16**	GND
GND	**17**	**18**	GND
	19	**20**	

3.1.10 USB device（J9）

- Standard type-B connector
- Resources from MCU（DDP，DDM，PD9，PD14）
- PD14 is used for USB detection
- Max:12Mbps

Pin	Signal	Function
1	VBUS	Power supply (+5V)
2	D-	USB signal
3	D+	USB signal
4	GND	Power supply (GND)

3.1.11 USB HOST（J5）

- Dual type-A connector
- 500mA current limited
- Max: 12Mbps
- Resources from MCU (HDMA, HDPA, HDMB, HDPB)

+5V	**1**	**5**	+5V
USBM0	**2**	**6**	USBM1
USBP0	**3**	**7**	USBP1
GND	**4**	**8**	GND

3.1.12 SD card（J15）

- SDIO mode
- Standard SD card connector
- Resources from MCU：

SDCARD	PA6	MCI1_CK
	PA7	MCI1_CDA
	PA8	MCI1_DA0
	PA9	MCI1_DA1
	PA10	MCI1_DA2
	PA11	MCI1_DA3
	PA30	Insert detect
	PD12	Write protect

3.1.13 Audio（J17,J18）

- Standard 3.5mm headphone connectors
- J17: headphone
- J18: MIC
- Resources from MCU

AC97	PB0	AC97FS
	PB1	AC97CK
	PB2	AC97TX
	PB3	AC97RX
	PE22	NC(RESET_AUDIO)

Besides the audio signal lead out on U9(2*5pin headers 2.54mm), U9 definitions as follows:

VOUT_R	**1**	**2**	VOUT_L
LINE_R	**3**	**4**	LINE_L
GND	**5**	**6**	GND
MIC_2	**7**	**8**	MIC_1
SPK_A	**9**	**10**	SPK_B

SPK_A SPK_B can be connected to a speaker(<=1.5W)

3.1.14 JTAG（J8）

VDD33	**1**	**2**	VDD33
NTRST	**3**	**4**	GND
TDI	**5**	**6**	GND
TMS	**7**	**8**	GND
TCK	**9**	**10**	GND
RTCK	**11**	**12**	GND
TDO	**13**	**14**	GND
Nreset	**15**	**16**	GND
	17	**18**	GND
	19	**20**	GND

3.1.15 TFT LCD（J20）

- Dual pin headers 40PIN(2*20) 2.54mm
- Support 2048*2048(max),16bit TFT LCD
- Resources from MCU

LCD	PB9	LCDCC
	PC0	LCDVSYNC
	PC1	LCDHSYNC
	PC2	LCDDOTCK
	PC3	LCDDEN
	PE17	LCD_POWEREN
	PC4	B3
	PC5	B4
	PC6	B5
	PC7	B6
	PC8	B7
	PC9	G2
	PC10	G3
	PC11	G4
	PC12	G5
	PC13	G6
	PC14	G7
	PC15	R3
	PC16	R4
	PC17	R5
	PC18	R6
	PC19	R7

- POWER：+5V，+12V can be connected to J20

- When using a 3.5” LCD, J21 and J22 do not need to be connected. When using a 4.3, 5.6 or 7” LCD, J21 must be connected to enable the +5V power supply.
- By default J22 is not connected

J20 definition :

GND	**1**	**2**	PB2
HSYNC	**3**	**4**	VSYNC
GND	**5**	**6**	
R3	**7**	**8**	R4
R5	**9**	**10**	R6
R7	**11**	**12**	GND
G2	**13**	**14**	G3
G4	**15**	**16**	G5
G6	**17**	**18**	G7
GND	**19**	**20**	
B3	**21**	**22**	B4
B5	**23**	**24**	B6
B7	**25**	**26**	GND
LCDDEN	**27**	**28**	VDD33
VDD33	**29**	**30**	
	31	**32**	Y+
X-	**33**	**34**	Y-
X+	**35**	**36**	PWREN
	37	**38**	BRIGHT
+5V	**39**	**40**	+12V

Note:

🕮 before you use an LCD, you must configure jumpers J28 & J29

J28	J29	CONFIG
0	0	3.5″ LCD
0	1	4.3″ LCD
1	0	5.6″ LCD
1	1	7″ LCD

When the system is started, it will first read the config pins, after which the corresponding LCD driver will be loaded.

3.1.16 Keys

- There are four keys on the board, i.e.:K1, K2, WKUP & RESET
- K1 = PC26
- K2 = PC27

3.1.17 Touch screen（J20）

- Signal name：X+, X-, Y+, Y-
- Resource：ADS7843 extended

TOUCH	PA0,1,2	SPI signal
	PA4	SPI0_NPCS2
	PA15	TOUCH_IRQ
	PA31	BUSY

3.1.18 Panel（J6）

- Dual pin headers 2.54mm
- Panel can be redefined by user

Signal explanation:

VDD33	Power voltage
WKUP	Wake up MCU
PE18	System status indicator lamp (general IO)
NRST_INPUT	Reset
SW1-12V, SW2	Power switch, if you connect these two pins together the board power will be on

J26 definition:

VDD33	**13**	**14**	GND
WKUP	**15**	**16**	PE18
NRST_INPUT	**17**	**18**	GND
SW1-12V	**19**	**20**	SW2

3.1.19 GPIO（J4，J25，J6）

- Total of 41 GPIOs
- Dual pin headers 2 x 20, 2.54mm
- Range of input voltage: VIL= -0.3 ~ 0.8v, VIH = 2 ~ 3.6v
- Output current: 8mA
- Programmable 100 KΩ pull up register is installed inside the chip
- All can be configured in interrupt mode
- Resource from MCU:(J4，J6，J25 definition)

J4 (18) :

VDD33	**1**	**2**	GND
PB30	**3**	**4**	PB31
PE0	**5**	**6**	PE8
PE1	**7**	**8**	PE9
PE2	**9**	**10**	PE10
PE3	**11**	**12**	PE11
PE4	**13**	**14**	PE12
PE5	**15**	**16**	PE13
PE6	**17**	**18**	PE14
PE7	**19**	**20**	PE15

J6 (11):

				J25 (12):			
PA12	**1**	**2**	PA16	PB4	**1**	**2**	PB5
PA17	**3**	**4**	PA18	GND	**3**	**4**	PC23
PA19	**5**	**6**	PA20	PC20	**5**	**6**	PC24
PC28	**7**	**8**	PC29	PC21	**7**	**8**	
PB8	**9**	**10**	PB29	PC22	**9**	**10**	
	11	**12**		VDD33	**11**	**12**	VDD5V
VDD33	**13**	**14**	GND	PB12	**13**	**14**	PB16
WKUP	**15**	**16**	PE18	PB13	**15**	**16**	PB17
NRESET	**17**	**18**	GND	PB14	**17**	**18**	PB18
SW1-12V	**19**	**20**	SW2	PB15	**19**	**20**	GND

The Multiplex of these IOs functions is as follows:

ISI Interface:

	PB30
	PB31
	PE0
	PE1
	PE2
	PE3
	PE4
	PE5
	PE6
	PE7
	PE8
	PE9
	PE10
	PE11
	PE12
	PE13
	PE14
ISI	PE15

SDIO0 Interface:

	PA12	MCI0_CK
	PA16	MCI0_CDB
	PA17	MCI0_DB0
	PA18	MCI0_DB1
	PA19	MCI0_DB2
SDIO0	PA20	MCI0_DB3

PWM Interface:

	PC28	PWM0
	PC29	PWM2
	PB8	PWM1
PWM	PB29	PWM3

SPI1 interface (4 chip select):

	PB12	SPI1_MISO
	PB13	SPI1_MOSI
	PB14	SPI1_SPCK
	PB15	SPI1_NPCS0
	PB16	SPI1_NPCS1
	PB17	SPI1_NPCS2
SPI1	PB18	SPI1_NPCS3

3.1.20 CAN (J26)

- 3.81MM Wire connectors
- CAN2.0 communication interface
- J26 definition PIN7———>CANL
- PIN8———>CANH
- Resources from MCU:

CAN	PA13	CANTX
	PA14	CANRX

J26 definition :

1	GND
2	+12V
3	+5V
4	GND_485
5	485A
6	485B
7	CAN_L
8	CAN_H

3.1.21 TWI (J25)

- System provides a 2Kb EEPROM, TWI interface
- 2.54mm pin headers
- Resource :

EEPROM/TWI	PB4	TWD
	PB5	TWCK

TWI signal lead out to pin headers :

J25 PIN1 → PB4（TWD）

PIN2 → PB5（TWCK）

3.1.22 BUZZER (BUZZ)

ADC (J19) The system includes a buzzer, it can be controlled by GPIO: PE19 (low active)

3.1.23 ADC (J19)

- 8 channel 12bit ADC input
- +5V Reference Voltage
- This function is extended by ADS7844
- Resources from MCU:

ADC	PA0,1,2	
	PA3	SPI0_NPCS1
	PA21	AD_BUSY

Definition of the connector J19(2 x 10pin headers 2.54mm):

GND	1	2	GND
CH0	3	4	CH1
CH2	5	6	CH3
CH4	7	8	CH5
CH6	9	10	CH7
GND	11	12	GND
CH0_0	13	14	CH1_1
CH2_2	15	16	CH3_3
CH4_4	17	18	CH5_5
CH6_6	19	20	CH7_7

CH0-7 can be connected to your signal directly when the voltage is bellow +5V

If your signal voltage is above +5V, you need to provide an appropriate resistance according your project. Then you can measure your signal on the channel CH0_0-CH7_7.

4 Electrical System Description

- Power: Range (8-22V), default 12V-1.5A
- Power type: +1.2V, +2.5V, +3.3V, +5V, +12V
- Power consumption:

NO	Function	State	Consumption(MAX)	Total
1	AT91SAM9263	Full Speed	1.2V*78.3mA=94mW	398mW
2	DM9000A	Full Speed	3.3V *92mA=304mW	
3	USB HOST(AB)	Full Speed	500 mA *5V*2=5W	5W
4	SD card	Full Speed	200 mA *3.3V =660mW	0.66W
5	12Vpower input	Full Speed	500 mA *12V=6W	6W
6	5Vpower output	Full Speed	500 mA *5V=2.5W	2.5W
7	SDRAM	Full Speed	2*260 mA *3.3V =1.716W	1.716W
	NAND FLASH	Full Speed	30 mA *3.3V=0.099W	0.1W
The system current Limit：（0.398+5+0.66+6+2.5+1.716+0.1）/12=1.36A				

- Power output:12V 500 mA and 5V 500mA
- The system can provide USB with a 500mA limit, and can be protected with a fuse
- The actual measurement:12V-0.2A (with network cable, SD card, 1 U disk, MP3 playback, 3.5” LCD)
- Operating temperature:-10-70°C (support for -40-85°C)
- Core connector definition:

CON1				CON2			
NO.	Function	NO.	Function	NO.	Function	NO.	Function
1	3.3V	51	NC	1	A6	51	3.3V
2	3.3V	52	PD11	2	A5	52	3.3V

CON1				CON2			
NO.	Function	NO.	Function	NO.	Function	NO.	Function
3	D0	53	D15	3	A4	53	PB0
4	D1	54	D14	4	A3	54	PB1
5	D2	55	D13	5	A2	55	PC15
6	D3	56	D12	6	A1	56	PC16
7	D4	57	D11	7	A0	57	PB4
8	D5	58	D10	8	PC25	58	PB5
9	D6	59	D9	9	PC23	59	PA6
10	D7	60	D8	10	PC20	60	PA7
11	PB9	61	PC0	11	PC14	61	PA8
12	PA12	62	PC1	12	PC8	62	PA9
13	PA16	63	PC2	13	PC22	63	PA10
14	PA18	64	PC3	14	PC10	64	PA11
15	PA19	65	PC4	15	PC11	65	PC13
16	PA17	66	PC6	16	PA15	66	PC27
17	PA20	67	NC	17	PA4	67	PB6
18	PD12	68	GND	18	PA0	68	PB7
19	3.3V	69	GND	19	PA1	69	PB11
20	3.3V	70	VSBAT	20	PA2	70	PB19
21	PC31	71	PE0	21	PD4	71	PB20
22	PA13	72	PE1	22	PD0	72	PC18
23	PA14	73	PE4	23	PC30	73	PB21
24	GND	74	PE6	24	PC28	74	PB22
25	GND	75	PE7	25	PC26	75	PB23
26	VDD12_BU	76	PE14	26	PC21	76	PB24
27	VDDCORE_1V2	77	PE15	27	PC24	77	PB25

CON1				CON2			
NO.	Function	NO.	Function	NO.	Function	NO.	Function
28	GND	78	PE9	28	PC17	78	PB26
29	GND	79	PE17	29	PC19	79	PB27
30	EBIO_NWE	80	PE18	30	PC9	80	PB28
31	EBIO_NRD	81	PE19	31	PC12	81	GND
32	PB8	82	PE20	32	PC7	82	PB30
33	PB2	83	PA25	33	PC5	83	PB31
34	PB29	84	PE16	34	PB16	84	TDI
35	PB3	85	PD6	35	GND	85	TMS
36	NRST	86	PD13	36	HDPB	86	TCK
37	WKUP	87	PD2	37	HDMB	87	RTCK
38	SHDN	88	PD3	38	HDPA	88	TDO
39	PB10	89	PD8	39	HDMA	89	NTRST
40	PC29	90	PD7	40	DDP	90	PE31
41	PA3	91	PD1	41	DDM	91	PE30
42	PA30	92	PE13	42	PD9	92	PE29
43	PA21	93	GND	43	PD14	93	PE28
44	PA23	94	PE10	44	NC	94	PE27
45	PA27	95	PE11	45	PB18	95	PE26
46	PA24	96	PE5	46	PB17	96	PE25
47	PA29	97	PE12	47	PB15	97	PE24
48	PA28	98	PE2	48	PB14	98	PE23
49	PA26	99	PE8	49	PB13	99	PE22
50	PA31	100	PE3	50	PB12	100	PE21

Appendix 1: 3.5” LCD

The interface employs 40-pin (2 x 20) dual pin headers with frame connector (2.54mm)

For the interface definition see below:

GND	**1**	**2**	LCDCLK
HSYNC	**3**	**4**	VSYNC
GND	**5**	**6**	R2
R3	**7**	**8**	R4
R5	**9**	**10**	R6
R7	**11**	**12**	GND
G2	**13**	**14**	G3
G4	**15**	**16**	G5
G6	**17**	**18**	G7
GND	**19**	**20**	B2
B3	**21**	**22**	B4
B5	**23**	**24**	B6
B7	**25**	**26**	GND
VDEN	**27**	**28**	+3.3V
+3.3V	**29**	**30**	
	31	**32**	Y+
X-	**33**	**34**	Y-
X+	**35**	**36**	PWREN
	37	**38**	VBIAS
+3.3V	**39**	**40**	GND

Appendix 2: 4.3, 5.6, 7” LCD:

The interface employs 40-pin(2*20) dual pin headers with frame as connector (2.54mm)

For the interface definition see below:

GND	**1**	**2**	LCDCLK
HSYNC	**3**	**4**	VSYNC
GND	**5**	**6**	R2
R3	**7**	**8**	R4
R5	**9**	**10**	R6
R7	**11**	**12**	GND
G2	**13**	**14**	G3
G4	**15**	**16**	G5
G6	**17**	**18**	G7
GND	**19**	**20**	B2
B3	**21**	**22**	B4
B5	**23**	**24**	B6
B7	**25**	**26**	GND
VDEN	**27**	**28**	+3.3V
+3.3V	**29**	**30**	
	31	**32**	Y+
X-	**33**	**34**	Y-
X+	**35**	**36**	PWREN
	37	**38**	VBIAS
+5V	**39**	**40**	GND

Appendix 3: ESD Precautions & Handling Procedures

Please note that the board comes without any case/box and all components are exposed. Therefore, extra attention must be paid to ESD (electrostatic discharge) precautions. To effectively prevent electrostatic damage, please follow the steps below:

- Avoid carpets in cool, dry areas. Leave development kits in their anti-static packaging until ready to be installed.
- Dissipate static electricity before handling any system components (development kits) by touching a grounded metal object, such as the system unit unpainted metal chassis.
- If possible, use antistatic devices, such as wrist straps and floor mats.
- Always hold an evaluation board by its edges. Avoid touching the contacts and components on the board.
- Take care when connecting or disconnecting cables. A damaged cable can cause a short in the electrical circuit.
- Prevent damage to the connectors by aligning connector pins before you connect the cable. Misaligned connector pins can cause damage to system components at power-on.
- When disconnecting a cable, always pull on the cable connector or strain-relief loop, not on the cable itself.

Warning:

📖 This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Appendix 4: Technical support & Warranty

Embest Technology Co., Ltd. established in March of 2000, is a global provider of embedded hardware and software. Embest aims to help customers reduce time to market with improved quality by providing the most effective total solutions for the embedded industry. In the rapidly growing market of high end embedded systems, Embest provides comprehensive services to specify, develop and produce products and help customers to implement innovative technology and product features. Progressing from prototyping to the final product within a short time frame and thus shortening the time to market, and to achieve the lowest production costs possible. Embest insists on a simple business model: to offer customers high-performance, low-cost products with the best quality and service.

4.1 Technical support service

Embest provides one year of free technical support for all products. The technical support service covers:

- Embest embedded platform products software/hardware materials
- Assistance to customers with regards to compiling and running the source code we offer.
- Troubleshooting problems occurring on embedded software/hardware platforms if users have followed the instructions provided.
- Judge whether a product failure exists.

The situations listed below are not covered by our free technical support service, and Embest will handle the situation at our discretion:

- Customers encounter issues related to software or hardware during their development process
- Issues occur when users compile/run the embedded OS which has been modified by themselves.

- Customers encounter issues related to their own applications.
- Customers experience problems caused by unauthorised alteration of our software source code

4.2 Maintenance service clause

1. Product warranty will commence on the day of sale and last 12 months provided the product is used under normal conditions
2. The following situations are not covered by the warranty, Embest will charge service fees as appropriate:

- Customers fail to provide valid proof of purchase or the product identification tag is damaged, unreadable, altered or inconsistent with the product.
- Products are subject to damage caused by operations inconsistent with their specification;
- Products are subject to damage in either appearance or function due to natural disasters (flood, fire, earthquake, lightning strike or typhoon) or natural aging of components or other force majeure;
- Products are subject to damage in appearance or function due to power failure, external forces, water, animals or foreign materials;
- Products malfunction due to disassembly or alteration of components by customers, or repair by persons or organizations unauthorized by Embest Technology, or alteration from factory specifications, or configured or expanded with components that are not provided or recognized by Embest Technology;
- Product failures due to the software or systems installed by customers, inappropriate software settings or computer viruses;
- Products purchased from unauthorized merchants;

- Embest Technology takes no responsibility for fulfilling any warranty (verbal or written) that is not made by Embest Technology and not included in the scope of our warranty.

3. Within the period of warranty, the cost for sending products to Embest should be paid by the customer. The cost for returning the product to the customer will be paid by Embest. Any returns in either direction occurring after the warranty period has expired should be paid for by the customer.

4. Please contact technical support with any repair requests.

Note:

🕮 Embest Technology will not take any responsibility for products returned without the prior permission of the company.

4.3 Basic guidelines for protection and maintenance of LCDs

1. Do not use finger nails or other hard sharp objects to touch the surface of the LCD

2. Embest recommends purchasing specialist wipes to clean the LCD after long time use, avoid cleaning the surface with fingers or hands as this may leave fingerprints or smudges.

3. Do not clean the surface of the screen with unsuitable chemicals

Note:

🕮 Embest do not supply a maintenance service for LCDs. We suggest the customer immediately checks the LCD once in receipt of the goods. In the event that the LCD does not run or shows no display, the customer should inform Embest within 7 business days of delivery.

4.4 Value Added Services

We will provide following value added services:

- Driver development based on Embest embedded platforms for devices such as: serial ports, USB interface devices, and LCD screens.
- Control system transplantation, BSP driver development, API software development.
- Other value added services including supply of power adapters and LCD parts.
- Other OEM/ODM services.
- Technical training.

Please contact Embest with any technical support queries:

http://www.embest-tech.com/contact-us.html